

The whole account will well repay a careful perusal, and anyone engaged on the design of a flying machine will find much useful information in the results of the various experiments on bodies rotating in a current of air.

### THE MEXICAN EARTHQUAKE.

ANOTHER great earthquake has been added to the series which has marked the recent increase in seismic and volcanic activity along the Pacific coast of America. At 11.30 p.m. on Sunday, April 14, or about 6 a.m. of April 15 by Greenwich time, the greater part of Mexico was visited by a destructive earthquake. As usual, the first accounts were not only exaggerated, but gave an erroneous impression of the distribution of damage; Mexico city, which was represented as almost destroyed, proved by later accounts to have been comparatively little damaged; while the towns of Chilpancingo and Chilapu, as well as some others not to be found in ordinary atlases, suffered great destruction. The sea-coast towns from Salina Cruz to Acapulco suffered severely, and a portion of the latter is said to have been submerged. The shock is reported as severe at San Luis Potori and Juan Batista, though no damage was done at either place; these two cities are about 530 miles apart and about 350 miles from the region of greatest damage, so we may estimate the area over which the shock was sensible as extending to somewhere about 500 miles from the centre of the disturbance.

The earliest reports stated that railway communication between Mexico city and Vera Cruz was suspended owing to the sinking of the permanent way, but this news, which has not been corroborated in later telegrams, is the only suggestion that the focus of the earthquake may have extended to any distance from the west coast. Everything else points to the conclusion that it originated close to the shore-line of the Pacific, and was partly, if not wholly, submarine. Sea-quakes are common in this region; sometimes they are felt by ships at sea though unnoticed on shore, and in at least one instance seem to have caused the loss of a ship. The story is a remarkable one. On October 3, 1902, the German barque *Freya* cleared from Manzanillo for Panta Arenas; nothing more has been heard of the captain or crew, but the ship was found, twenty days later, partially dismantled and lying on its side. There was nothing to explain the condition of the ship, but a wall calendar in the captain's cabin showed that the catastrophe must have overtaken it on October 4, not long after leaving port, as was also indicated by the anchor being found still hanging free at the bow. Weather reports show that only light winds were experienced in this region from October 3 to October 5, but, on the other hand severe earthquakes were felt at Acapulco and Chilpancingo on October 4 and 5, one of which probably caused the damage to the *Freya* which led to its abandonment.

Prominence has been given in the daily papers to earthquakes in Spain and Italy, which occurred shortly after the Mexican one; but they were of an order the occurrence of which is too frequent to justify any direct connection between them and the greater one. It may be different as regards the other two large earthquakes, which were registered at 9.10 p.m. on April 18, and at oh. 11 a.m. on April 19; no news of these shocks has yet reached us; they must have been earthquakes of the first order of importance, but are only known from distant records, which are interpreted as showing that they originated at about 90° from western Europe. This is about the distance of Mexico, but it is rare for after-

shocks to be of as great magnitude as these; on the other hand, it is not uncommon for earthquakes to take place in groups, usually originating at nearly opposite points in the globe. We may consequently, in the absence of news of a great earthquake in America or Japan, look for the origin of these two earthquakes in the North Pacific Ocean on the eastern part of the Malay Peninsula.

### TUBERCULOSIS RESEARCH AND VIVISECTION.

THE investigations conducted by the Royal Commission on Tuberculosis, contained in a second interim report recently issued,<sup>1</sup> would have been impossible without the use of experiments on animals, and the appearance of this report is most opportune, for, almost simultaneously, the Royal Commission on Vivisection has published the first volume of the minutes of evidence taken before it.

As regards the investigations on tuberculosis, thirty different viruses isolated from cases of tuberculosis occurring spontaneously in bovines have been studied, and the results of introducing them into a number of different animals by feeding and by inoculation are recorded. In calves, inoculation usually results in generalised progressive tuberculosis, but the effect is somewhat dependent on the dose, *i.e.* the number of bacilli, administered. Feeding, on the other hand, usually produces lesions limited to the neighbourhood of the digestive tract, which generally retrogress and become calcareous. The bovine bacillus, when introduced into rhesus monkeys or chimpanzees either by inoculation or by feeding, induces rapid generalised tuberculosis, and considering the close relation that exists between the anthropoid apes and man, these results are of the highest importance. In pigs generalised progressive tuberculosis is readily set up both by feeding with, and by the inoculation of, bovine bacilli. Goats, dogs, and cats are relatively less susceptible, but more or less tuberculous infection can similarly be produced in them. On this part of the investigation the commissioners remark that the bacillus of bovine tuberculosis is not so constituted as to act on bovine tissues only, and the fact that it can readily infect the anthropoid apes, and, indeed, seems to produce this result more readily than in the bovine body itself, has an importance so obvious that it need not be dwelt on.

The viruses isolated from sixty cases of the disease in man have also been studied, and the results obtained show that they may be divided into two groups, subsequently referred to as group i. and group ii. The bacilli of group i. were mostly obtained from cases of abdominal tuberculosis occurring in children, and the results produced by introducing them into animals are identical with those produced by the bovine bacillus. The bacilli of group ii., obtained from various forms of human tuberculosis, grow more luxuriantly in culture than those of group i., and inoculated into calves and rabbits do not produce the generalised and fatal disease caused by the bovine bacillus, but in rhesus monkeys and in the chimpanzee set up a general tuberculosis. Certain human viruses, differing in certain respects from those of groups i. and ii., were also met with, and are classed as group iii., but an opinion on their significance is reserved for a future report.

The commissioners conclude that the tubercle bacillus in its nutritive and reproductive powers re-

<sup>1</sup> Second Interim Report of the Royal Commission appointed to inquire into the Relations of Human and Animal Tuberculosis, Part i., Report. Part ii., Appendix. Vol. iv., "Comparative Histological and Bacteriological Investigations." By Dr. Arthur Eastwood.

sembles other simple organisms, and that the essential difference between one strain and another depends on variations in these factors, and they therefore classify the bacilli as *dysgonic*, those that grow with difficulty on artificial media, and as *eugonic*, those that grow readily on the same media.

The bearings of the results obtained are thus summarised:—

"There can be no doubt that in a certain number of cases the tuberculosis occurring in the human subject, especially in children, is the direct result of the introduction into the human body of the bacillus of bovine tuberculosis, and that in the majority of these cases the disease is introduced through cow's milk. Our results clearly point to the necessity of measures more stringent than those at present enforced being taken to prevent the sale or the consumption of tuberculous milk." The details of the various experiments are published in the appendix, in which Dr. Eastwood gives a full description of the histology of the lesions in the various animals inoculated, and of the bacteriology of the bacilli isolated from them, together with the methods employed. This appendix is a volume of 300 pages, illustrated with tables and charts, and must rank as a first-rate piece of work. Dr. Eastwood concludes that there is an essential unity, not only in the nature of the morbid processes induced by human and bovine tubercle bacilli, but also in the bacteriological characters of the tubercle bacilli which cause these processes.

As regards the minutes of evidence taken before the Vivisection Commission,<sup>1</sup> the witnesses so far called include Mr. W. P. Byrne, C.B., who discussed the procedure of the Home Office in the granting of licences and in the administration of the present Act; Mr. G. D. Thane, Sir J. Russell, and Sir W. Thornley Stoker, the official inspectors under the Act; Mrs. K. Cook and Dr. Snow, representing anti-vivisection associations; Mr. Stockman, chief veterinary officer of the Board of Agriculture; and Prof. Starling.

As already suggested, the work of the Royal Commission on Tuberculosis, reviewed above, affords one of the most striking examples of the necessity for, and of the value of, experiments on animals, and the evidence so far given before the Vivisection Commission has brought out the fact of the scrupulous observance of the conditions of their licences by the various holders of the same, of the complete absence of that cruelty and callousness for which the experimenters have been assailed by those who advocate the abolition of vivisection, and of the absolute necessity for the experimental method in the medical and biological sciences if these are to advance. The inspectors seem agreed that there is no need for more inspection in order to check abuses. Surprise visits can be, and are, paid at any time, and what each worker is doing is known to the Home Office.

#### NOTES.

The absence of official representatives of the British Government at the celebrations connected with the opening of the Carnegie Institute at Pittsburg formed the subject of questions asked in both Houses of Parliament on Monday. The replies were to the effect that our Ambassador to the United States was prevented by other engagements from attending the celebrations; and Lord Fitzmaurice added:—"I am exceedingly glad of the opportunity publicly to state how much His Majesty's Government, and our Ambassador at Washington, appre-

ciate the importance of that occasion." In his explanation to the House of Commons Mr. Runciman said:—"Neither the German, Austro-Hungarian, French, nor Russian Embassies were represented at Pittsburg. It is understood that the Universities of Oxford and Cambridge were represented at the celebrations at Pittsburg, and on such an occasion the presence of members of the greatest educational institutions of the country would appear to be the form of representation most suitable and convenient." The explanations do not appear to us to be entirely satisfactory. That representatives of British universities were present at Pittsburg is not a circumstance for which the Government can claim any credit. If these guests of Mr. Carnegie had been asked to represent the Government on the occasion the case would have been different, but no official notice was taken of them or of the event. When every allowance has been made, the fact remains that the German Emperor took advantage of an opportunity to show his interest in the advancement of knowledge, and that the British Government failed to do so.

A MEDALLION in memory of the late Pierre Curie, by M. Vernier, has been placed on the wall of his laboratory at the Ecole municipale de Physique et de Chimie, Paris.

ON May 6, 8, and 10, Prof. W. Wright will deliver three Hunterian lectures of the Royal College of Surgeons on "The Prehistoric and Early Historic Inhabitants of England."

DR. G. O. SMITH has been appointed director of the U.S. Geological Survey to fill the vacancy caused by the election of Dr. C. D. Walcott to the secretaryship of the Smithsonian Institution.

ON Saturday next, May 4, Prof. W. C. McIntosh will begin a course of two lectures at the Royal Institution on "Scientific Work in the Sea Fisheries." The Friday evening discourse on May 3 will be delivered by Sir James Crichton Browne, on "Dexterity and the Bend Sinister," and on May 10 by Signor Com<sup>e</sup> Giacomo Boni, on "Recent Excavations on the Forum Romanum, and the Forum Ulpium."

THE death is announced, on Saturday, April 13, of Mr. C. L. Griesbach, C.I.E., formerly director of the Geological Survey of India. Born in Vienna on December 11, 1847, he was educated in the university of that city. Afterwards coming to England, he was appointed to the Geological Survey of India in 1878, made director of it in 1894, and retired from the post in 1903. His most important geological work was done beyond the frontiers of British India, and especially in Afghanistan, which he visited first with the Canadian field force in the Afghan war, again with the Afghan Boundary Commission in 1884-6, and for a third time as adviser to the Amir in 1888-9. His descriptions are still the only available sources of information regarding the geology of much of the country seen by him on these occasions. The popular idea, that a desire to avoid military service is the reason why foreigners settle in this country, was not borne out by Mr. Griesbach, who joined the British Army shortly after his arrival in England, saw active service in Candahar, was mentioned in despatches, earned war medals and clasps, and was made a C.I.E. for his services with the Afghan Boundary Commission.

WE regret to learn of the death, on Saturday last, of Mr. George E. Davis, the founder and editor of the *Chemical Trade Journal*. Mr. Davis was one of the original fellows, and subsequently a member of council, of

<sup>1</sup> Royal Commission on Vivisection. Appendix to First Report of the Commissioners. Minutes of Evidence, October to December, 1906.